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EEE BRANCH REVIEW

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FILE OR REG. NO. 1471-35

PETITION OR (EXP. PERMIT NO.)

DATE DIV. RECEIVED

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TYPE PRODUCT(S): I, D, (H), F, N, R, S Herbicide

DATA ACCESSION NO(S).

PRODUCT MGR. NO. (23) Garner

PRODUCT NAME(S) Treflan E.C.

COMPANY NAME Elanco Products Company

SUBMISSION PURPOSE Label Amendment;
New uses on Field Corn, Sorghum, Barley

CHEMICAL FORMULATION α,α,α,-Trifluro-2,6-Dinitro-N,N-Dipropyl-p-
Toluidine 44.5% Emulsifiable Concentrate

Pesticide Name Treflan

100 Pesticide Label Information

100.1 Pesticide Use

Treflan (trifluralin) is a selective, preemergence, soil-incorporated herbicide used for preventing the emergence of grasses and broadleaf weeds in a variety of crops. It was the first and most prominent of a series of dinitroaniline (or toluidine) herbicides introduced to agriculture in the 1960's. The proposed amendment would add the additional uses for weed control to field corn, grain sorghum and barley.

100.2 Formulation Information

Emulsifiable concentrate with 44.5% active ingredient.

100.3 Application Methods, Directions, Rates

See attached appendix.

100.4 Target Organisms

See attached appendix.

100.5 Pecautionary Labeling

Environmental Warning:

Direct contamination of any body of water with this emulsifiable concentrate may kill fish and other aquatic organisms. Do not contaminate any body of water by direct application, cleaning of equipment or disposal of wastes.

101 Physical and Chemical Properties

See review by D. J. McLane (10/22/79).

102 Behavior in the Environment

See review by D. J. McLane (10/22/79

103 Toxicological Properties

See reviey by D. J. McLane (10/22/79).

104 Hazard Assessment

104.1 Discussion

Treflan E.C. is a very widely used herbicide for the prevention of grasses and broadleaf weeds infesting a variety of croplands. Treflan E.C. is currently registered for use on many crops throughout the United States, most notably cotton, soybeans, peanuts (Spanish), fruit and nut trees, and garden vegetables. The registered uses encompass approximately 75 million acres nationwide. The present amended registration would add the uses on field corn, sorghum and barley. These uses account for over 100 million additional acres. As herbicide use on corn alone amounts to over 40% of the general herbicide market, clearly the amendment represents a major new use.

104.2 Likelihood of Adverse Effects to Non-Target Organisms

It has been well established in previous EEB reviews and in the literature that Treflan E.C., when applied according to the directions and thoroughly incorporated, does not pose an acute hazard to terrestrial mammals and birds. When applied at maximum recommended rates and incorporated to 2 inches, Treflan E.C. results in soil residues of only 1.1 ppm trifuluralin. The LD_{50}'s for terrestrial vertebrates studies were all > 2000 mg/kg.

It has also been well established in previous EEB reviews and in the literature that trifulralin is highly toxic to aquatic organisms. Parrish et al. (1978) reported the chemically measured 96-hr. LC_{50} for sheepshead minnows, Cyprinodon variegatus, as 190 (128-282) ppb. Cope (19676) reported the 48-hr. EC_{50} of trifluralin as 11 ppb for rainbow trout (13°C) and 19 ppb for bluegill (24°C). Macek et al. (1969) observed that the acute toxicity of trifluralin increased with increased temperature. The 96-hour LC_{50} for bluegills was reported as 190 (160-230) ppb at 12.7°C, and 47(40-55)ppb at 23.8°C; the 96-hour LC_{50} for rainbow trout was 210(182-240) at 1.6°C and 42(38-46)ppb at 12.7°C, based on static tests. Macek et al (1976) reported the 48-hour LC_{50} for Daphnia magna as 193 (155-327) ppb. The MATC for fathead minnows was > 1.9 < 5.1 ppb. According to Parrish et al. (1978), the MATC for sheepshead minnows was > 1.3 < 4.8 ppb.

The aquatic toxicity of trifluralin is mitigated by several factors. Trifluralin is highly soil bound, it has a soil absorption coefficient of 13,700, and is water souluble only to 0.6 ppm. Therefore, trifulralin is not subject to leaching and is relatively immobile. Also, the method of application precludes chance of accidental introduction directly into aquatic systems.

Sheets et al. (1972) in studying the loss of trifluralin in runoff water from cotton plots when applied at 1.0 lb. active ingredient/acre reported the highest concentration as 24 ppb in filtered runoff water and 1.6 ppb (usually .08 - .44 ppb over the 2-year period) in filtered water from a small pond receiving runoff. Pond sediment usually contained about 10 ppb and

concentrations ranged to as high as 110 ppb over a 2-year period. The amount of trifluralin entering runoff amounts to between 0.27 - 0.76% of the applied. The runoff was partitioned with .07 - .09% of the applied in water and .20 - .67% in sediment.

A conservative estimate of the environmental concentration of a typical aquifer in the area of the proposed new use (i.e. Southern Illinois) is 1 ppb, partitioned between water and sediment. This value is based upon a 1-hectare lake with an average depth of 2 m receiving runoff from a 2-hectare drainage basin.

Considering the bioconcentrating properties of trifluralin, which have variously been reported at between 4200 - 11,538 x for fish and at 153,000 x for snails (Sanborn, 1974; Parrish et al., 1978), a potential chronic hazard may exist. Additional studies are needed to determine if this bioconcentrating ability of trifluralin represents a bioaccumulating tendency, and if there is a maximum body burden for aquatic organisms.

The vapor pressure of trifluralin is very high (1.14×10^{-14} mmHg at 30°C), and consequently, volatilization is an important mode of loss from soil surfaces. Although the trifluralin which evaporates from the soil surface would reduce the amount of trifluralin available to enter runoff, it is not known if the volatilized trifluralin is completely degraded in the atmosphere before returning to the surface (i.e. in precipitation) and perhaps entering aquatic systems. Additional information is necessary to determine the environmental fate of volatilized trifluralin.

104.3 Endangered Species Considerations

Endangered mammals and birds in the Treflan E.C. use area should not be adversely affected by the proposed registration. Additional information is needed to complete a hazard evaluation on aquatic endangered species.

105/106 Classification/RPAR Criteria

Additional information is needed before a final determination on classification can be made.

107 Conclusions

The Ecological Effects Branch does not concur with the amended registration of Treflan E.C. herbicide on field corn, sorghum and barley. Additional information is necessary to complete a hazard assessment.

107.1 Environmental Fate and Toxicity

Environmental Fate and Toxicity information from previous reviews was available.

107.2/107.3 Labeling

The label for Treflan E.C. herbicide may require modification to reflect environmental hazards. The exact changes necessary cannot be determined until additional information is available.

107.4 Data Adequately Conclusions

No record of the avian dietary toxicity studies required to support registration is available. Additional studies are necessary to complete a hazard evaluation of potential chronic effects from the use of Treflan E.C. (see 107.5).

107.5 Data Requests

The following special studies are required by the Ecological Effects Branch before an Environmental Hazard Assessment can be completed.

1. An Aquatic Invertebrate Acute Toxicity study on the freshwater mussel Elliptio complanatus or a similar species.

2. An Aquatic Invertebrate Chronic Toxicity study to determine the MATC for the freshwater mussel (Elliptio complanatus) similar species. Also, the maximum body burden of trifluralin residues should be determined.

3. A Fish Chronic Toxicity study to determine the maximum body burden of trifluralin residues for the fathead minnow, brook trout or similar species.

4. The maximum potential for the bioaccumulation of trifluralin in aquatic systems and higher trophic levels should be determined.

5. The environmental fate of volatilized trifluralin should be determined.

Additionally, an Avian Dietary Toxicity study for the Bobwhite quail and for the Mallard duck are necessary to support registration.

The registrant should direct any questions concerning the above data requests or for questions on appropriate test protocols to the Ecological Effects Branch.

2/19/80

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2/19/80

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2/20/80

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References

Cope, O. B. (1966) Contamination of Freshwater Ecosystems by Pesticides. J. Appl. Ecol. 3:33-44

Macek, K. J., C. Hutchinson and O. B. Cope (1969) The Effects of Temperature on the Susceptibility of Bluegills and Rainbow Trout to Selected Pesticides. Bull. Env. Contam. and Toxicol. 4(3):174-183.

Macek, K. J., M.A. Lindberg, S. Sauter, K. S. Buxton, P.A. Costa (1976). Toxicity of Four Pesticides to Water Fleas and Fathead Minnows. U.S. EPA, Ecol. Res. Series, No. EPA-600/3-76-099, 68 pp.

Parrish, P.R., Dyar, E.E. Enos, J.M., Wilson, W. G. (1978) U.S. Environmental Protection Agency, Gulf Breeze, FL. EPA-600/3-78-010, 53 pp.